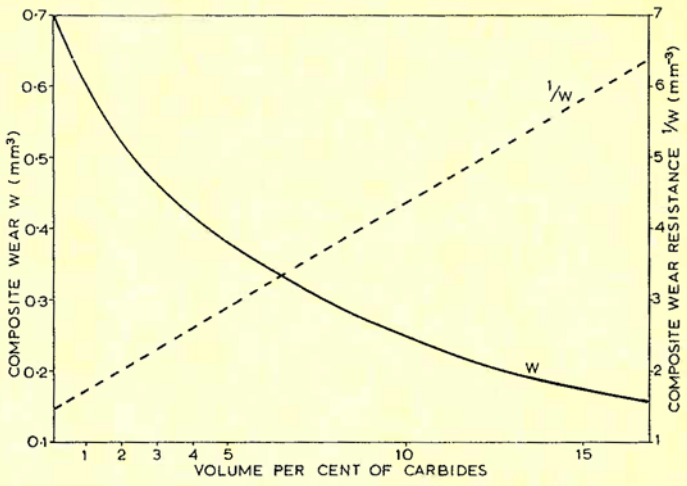

Fig. 4 Dependence of composite wear and wear resistance on the amount of carbide present in the gold deposit. All four systems investigated—acid cyanide and alkaline sulphite golds with titanium and tungsten carbides—gave approximately the same relationship

composites. It is probable that mechanical restraint of matrix deformation by the hard non-deformable particles plays an important role in strengthening.

Conclusions

Composite gold-refractory carbide coatings formed by electrodeposition have been found to have considerably enhanced hardness, strength, and rubbing wear characteristics compared to gold electroplate. Because the carbide particles are chemically inert the corrosion resistance and electrical contact resistance properties approach those of pure gold.

It is considered that such deposits could find extensive use in sliding contact applications in which exposure and tarnishing of substrate base metal through wear of the gold plate is a problem. Similar considerations may encourage the use of composite gold electroplates in decorative jewellery applications especially with the possibility of obtaining various attractive finishes by varying the size and volume of co-deposited particles.

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